

The Morgan Guaranty Survey

published monthly by
**Morgan Guaranty
Trust Company
of New York**

DECEMBER 1982

Interest Impact. *The drop in interest rates means gains for some, losses for others. Analysis of effects on key sectors in 1983.* 1

Economy Watch. *Weakening trend in the current quarter. But modest growth lies ahead. Outlook for 1983, with detailed projections.* 4

Financial Futures. *The most widely traded futures no longer are wheat or soybeans. Financial instruments have taken over. Laurence Berger, head of Morgan Futures Corporation, spotlights a booming new market.* 6

Population Patterns. *Growth in world population slows. Fears of an "explosion" recede. But demographers say it's too early to relax. Latest trends—and implications.* 10

Index of 1982 Articles 15

The Effects of Lower Interest Rates

THE tumble in interest rates since mid-year* brings welcome relief for borrowers—whether they are individuals, businesses, or governments. And as lower rates stimulate credit-sensitive industries, such as housing and autos, the overall economy is bound to benefit.

But a sector-by-sector analysis shows that the drop in interest rates is not an unmixed blessing. It will mean the transfer of purchasing power from those sectors of the economy that are net lenders to those that are net borrowers.

For example, individuals—the biggest lenders in the economy—seem likely to come out on the short end. The nation's thrift institutions should gain dramatically. So, too, will most businesses and the federal government.

While these broad trends seem likely, their effect on the economy is difficult to anticipate. The reason is that the expected swing in interest earnings in 1983 is much larger than anything that has occurred in previous business cycles. This, in turn, is because both the size and the sensitivity of interest income flows has increased.

In the 1950s, interest income represented only 1.8% of national income. That share rose to 3.6% in the 1960s, 6.2% in the 1970s, and in 1982 reached 11% of national income.

The increased sensitivity is due, in large part, to an increase in the size of interest-rate swings. For example, in the 1958 recession the average annual prime rate fell by only 0.4 percentage points—from 4.2% in 1957 to 3.8% in 1958. In the 1974-75 recession it fell 4.0 percentage

*Since midyear, long-term rates have dropped more than four percentage points while short-term rates are down more than five percentage points.

points. But in the current economic cycle it has already fallen 7.4 percentage points—from 18.9% in 1981 to 11.5% currently. Moreover, the average yield on outstanding debt has become increasingly sensitive to changes in market rates. This is because businesses have relied increasingly on short-term debt that must be rolled over frequently. An added factor: Interest-rate ceilings on deposits at banks and thrift institutions have been made more flexible; rates on such debt now move up and down with market interest rates.

Such analytical difficulties notwithstanding, here are the major effects that lower interest rates are likely to have on income flows:

Households. Individuals were the main beneficiaries of the runup in interest rates and are likely to be the major losers from declining rates. The bulk of their assets takes the form of time and saving deposits (\$1.4 trillion outstanding at yearend 1981) and money-market funds, Treasury bills, and other short-term investments (\$300 billion outstanding).

During the four-year period 1978-82, interest income rose almost \$200 billion, or over 20% per year (accompanying table). This rise lifted the annual rate of increase of total personal income by a hefty 1.2 percentage points.

The recent decline in interest rates (and a small further decline projected for 1983 by The Morgan Bank) means that interest income in 1983 is likely to be flat. Declines in interest on short-term assets will largely offset increases in interest coming from a higher level of assets and continuing increases in the average yield on such long-term assets as municipal bonds. A flat pattern for personal-interest income would reduce the rate of total personal income growth more than one percentage point.

In addition to weaker interest earnings, individuals in 1983 are likely to face rising in-

The Importance of Interest Income

(Billions of dollars)

	Interest income		Personal income		Personal income, excluding interest income	
	Level	Percent change	Level	Percent change	Level	Percent change
1977	153	15.3	1541	10.7	1388	10.3
1978	179	17.4	1733	12.5	1554	12.0
1979	219	21.9	1951	12.6	1732	11.5
1980	263	20.4	2160	10.7	1896	9.5
1981	329	24.9	2416	11.8	2087	10.1
1982*	375	14.0	2572	6.5	2197	5.3
1983*	375	0	2730	6.1	2355	7.2

*Estimate

terest expense. That prospect arises since the average interest rate on outstanding home mortgages—the largest portion of household liabilities—will continue to rise.* Whereas the average rate on outstanding mortgages in 1982 was still below 11%, the average will rise in 1983 as old, low-yielding loans are replaced by 12% and 13% mortgages. Individuals thus will be squeezed between flat interest income and rising interest expense.

Thrift institutions. The balance sheets of thrift institutions are almost the reverse of household balance sheets—with short-term deposits their main liabilities and long-term mortgages their main assets. In an environment in recent years of rising interest rates and eased interest-rate restrictions on deposits, net interest earnings of thrifts have been squeezed (table on page 3). For example, between 1978 and the first half of 1982, the average interest rate on

*In the National Income Accounts, interest on mortgage debt is included in the "other business" sector, not in interest paid by the household sector.

borrowings by saving and loan associations (primarily consumer deposits) rose by almost five percentage points while the yield on their mortgages rose only two percentage points. The result was a swing in the spread between these rates from a positive 1.8 percentage points to a negative 1.0 percentage point. Thrift industry net-interest earnings collapsed.

In 1983, the cost to S&Ls of their borrowings is likely to slip back into single-digit figures while the yield on mortgage holdings should rise to around 11%. The spread would then swing back to a positive 1.5 percentage points. Such a swing would be worth over \$12 billion in increased net-interest earnings. A similar swing for mutual savings banks and some commercial banks would boost the increase in interest earnings of all financial corporations to well over \$20 billion.

Nonfinancial business. Nonfinancial corporations will also benefit from declining interest rates, but their gains are likely to be smaller than those of thrifts. This is because short-term

borrowings by some companies are partially offset by holdings of short-term assets by other companies. When these assets are taken into account, nonfinancial corporations' long-term debt (on which the average yield is likely to rise) is about twice their net short-term liabilities (on which rates will fall).

Corporate borrowing requirements will decline in 1983 as a result of a profit recovery and continued weak investment outlays. The combination of lower interest rates and lower outstandings suggests that nonfinancial corporate interest expense could fall in 1983. In each of the past three years interest expense has increased by \$10 billion, so any decline in 1983 should be reflected in improved corporate profits. Lower interest expense for financial and nonfinancial corporations combined should add 10% to 15% to the level of total profits in 1983. Most of the benefits will accrue to those firms that have been hardest hit by high interest rates in recent years.

Federal government. Interest paid by the federal government more than doubled between 1978 and 1982. At the end of September about \$280 billion in marketable Treasury bills was outstanding at an average yield of 12%. During the next year these bills will be rolled over at an average rate of something like 8%—for a reduction in interest expense of \$11 billion. In addition, some \$100 billion of notes and bonds with an average yield of 12.2% will mature during 1983. These will also be rolled over at significantly lower interest rates. This saving in interest expense, however, will be offset by enlarged borrowing to cover the budget deficit. As a result, net interest expense in the fourth quarter of 1983 will be about the same as in the current quarter.

Shifts in interest flows change the distribution rather than the level of total income. The

The Interest Squeeze on S&Ls

(Percent)

	Average cost of funds	Average yield on mortgages	Difference
1972	5.4	7.0	1.6
1973	5.6	7.2	1.6
1974	6.1	7.4	1.3
1975	6.3	7.7	1.4
1976	6.4	8.0	1.6
1977	6.4	8.2	1.8
1978	6.7	8.5	1.8
1979	7.5	8.8	1.3
1980	8.9	9.3	0.4
1981	10.9	9.9	-1.0
1982 (first half)	11.5	10.5	-1.0

major effect on the economy, therefore, is likely to be a shift in spending between sectors rather than an increase or decrease in total spending.

The direction of influence is clear: Falling interest income in 1983 should retard consumer spending, while reduced interest expense should boost profits and thus capital spending. A recovery in thrift profitability should help stimulate housing construction.

The magnitude of these effects can only be

guessed at. A drop in interest income is unlikely to have as strong an impact on consumption spending as would a drop, say, in wage or transfer income. But even if the response is relatively weak, the magnitude of the swing in interest flows is such that the total effect could be significant. The relative strength of personal consumption in the past two years can be attributed in part to the rapid growth of interest income. In the year ahead, that prop for consumer spending will be considerably weaker.

Economy Watch

THE economy provides little reason for good cheer this holiday season. Payroll employment fell 550,000 during the two months of October and November, compared with a decline of some 175,000 a month during the preceding twelve months of recession. The accelerating deterioration points to a decidedly weak pattern for both consumer income and GNP in 1982's final quarter. It now seems likely that real GNP will register a decline in the fourth quarter, rather than the fractional gain foreseen a month ago (table on page 5). Particularly worrisome in light of November's large jump in the unemployment rate to 10.8% is the distinct possibility that heightened concern about job security will depress Christmas sales.

The softening economy and higher unemployment are likely to keep inflation headed downward. Increases in both the consumer and producer-price indexes should hold well below 5% at annual rates in coming months as continuing weakness in commodity prices and heavy discounting by manufacturers and retailers are re-

flected in the indexes. An additional depressant will come from declines in oil prices: Reduced demand—due to warm weather and worldwide stagnation—has led to sharp declines in oil prices in recent weeks.

As price pressures ease and with unemployment remaining high, further moderation in wage increases is likely. In recent months the rate of increase in wage rates, as measured by the average hourly earnings index, has fallen below 6%. If this pattern is sustained, as seems increasingly likely, it would represent the slowest pace of wage-rate gains since 1967.

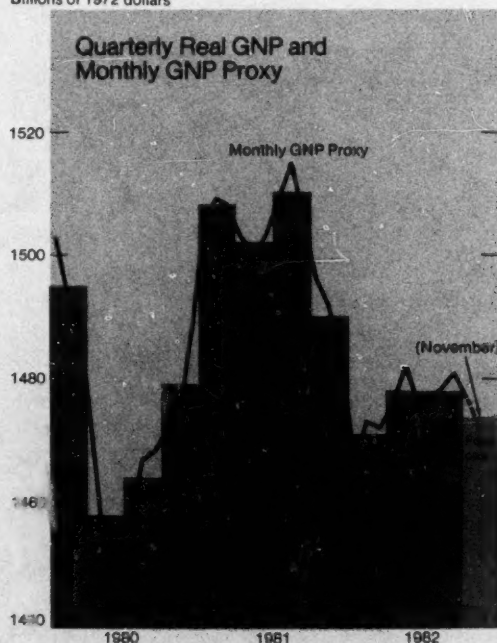
The weaker economy clearly increases the probability that the decline in interest rates will continue. And lower interest rates, in time, should help nurture economic recovery. The process is likely to be slow, but the consensus forecast of a reasonably strong second half of 1983 (with real GNP growing at an annual rate of 4% or better) looks increasingly reasonable.

That, however, does not promise any significant reduction of unemployment over the next year. One key reason is the recent favorable

turn in labor productivity. After showing moderate gains in both the first and second quarters of this year (when, because of recession, the normal expectation would be for productivity to decline), output per man-hour in the private nonfarm economy strengthened dramatically in the third quarter to a 4% annual rate of increase. That tends to confirm earlier hints* that the decade-long slump in productivity is coming to an end. Although this is good news for the fight against inflation, it also means that it will be possible to achieve higher output through greater efficiency rather than by adding workers to payrolls. Partly because of this, The Morgan Bank's economic forecast sees the jobless rate

*"Productivity: Signs of Improvement," *The Morgan Guaranty Survey*, September 1982.

Billions of 1972 dollars



Note: Proxy is derived by interpolation from quarterly GNP (actual and projected) on the basis of available monthly data.

Economic Projections

(Percent change at annual rate from previous quarter, except where noted)

	1982			1983	
	Q2	Q3	Q4	Q1	Q2
Real GNP	2.1	0	-1.1	2.3	3.6
Real consumer spending	2.5	1.1	2.4	2.2	4.3
Real business-capital outlays	-11.8	-10.8	-11.3	-6.5	3.3
GNP deflator	4.6	4.7	5.5	4.6	5.3
Consumer prices	4.6	7.6	3.1	2.9	5.9
Real disposable personal income	3.1	2.3	-0.1	2.3	-0.1
Saving rate (%)	6.7	7.0	6.5	6.5	5.5
Housing starts (Millions)	1.0	1.1	1.2	1.3	1.5
Auto sales (Millions)	7.5	7.7	8.6	8.5	9.1
Unemployment rate (%)	9.5	9.9	10.7	11.0	11.2

Note: 1982 Q2 and Q3 data are actual.

piercing the 11% mark shortly and holding at that level throughout 1983.

The possibility that unemployment will be especially sticky in 1983 could be expected to bolster the activist, Keynesian-like inclinations now becoming evident in Washington. But whether that will in fact translate into substantial new stimulus is unclear, because enlargement of an already bulging budget deficit is not an attractive option. The recent further weakening of economic activity—together with higher-than-expected unemployment benefits—suggests that the fiscal 1983 deficit could exceed \$170 billion, some \$15 billion larger than seemed likely just a month ago. Such red-ink prospects may work to prevent substantial new fiscal initiatives. If so, the policy focus in 1983 is likely to turn increasingly toward the monetary side.

The Booming Market in Financial Futures

The following article was written by Laurence W. Berger, managing director of Morgan Futures Corporation, a subsidiary of J. P. Morgan & Co. Incorporated.

FINANCIAL futures are becoming an increasingly important part of the money and capital markets in this country and overseas. An innovation that didn't exist a decade ago, the market in financial futures has grown spectacularly. In terms of numbers of contracts traded, for instance, Treasury bond futures have become the most widely traded futures in the world—outpacing wheat, soybeans, and pork bellies.

Money managers, corporate treasurers, and financial institutions have turned increasingly to financial futures as a source of income as well as a tool in financial management. Some participants have sought profits trading futures just as they would trading cash instruments. Others have used financial futures to protect themselves against swings in interest rates that have become more pronounced since October 1979, when the Federal Reserve switched policy emphasis from managing interest rates to managing the monetary aggregates. By hedging, market participants can use financial futures to reduce interest-rate risk. The mechanics of hedging shift risk from one set of market participants to another—market makers and speculators, in particular—who assume above-average risks in pursuit of above-average gains.

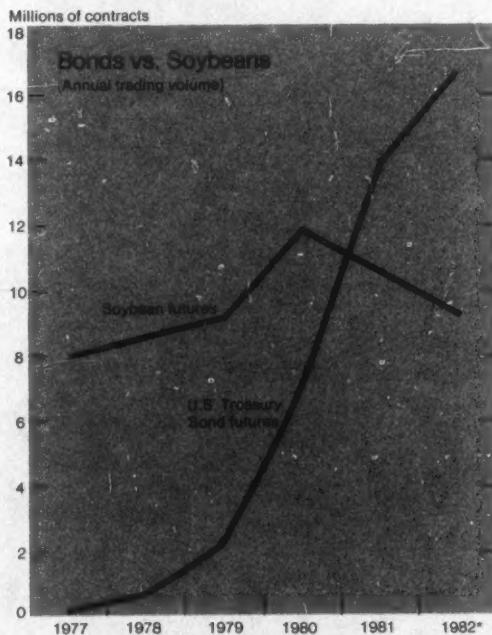
In recent months, the daily dollar volume of trading in Treasury bill futures has ranged between \$25 billion and \$30 billion—well above the volume of T-bills traded in the cash market (chart on page 7). Daily trading in Treasury bond futures has been more than triple that

in the cash market (\$6 billion vs. \$2 billion).

Treasury bonds and bills are the most actively traded contracts, but within the past year and a half new futures contracts in certificates of deposit, Eurodollars, Treasury notes, and stock indexes have been listed for trading. And, in early October, a new market in futures options for Treasury bonds and gold got under way.*

The enthusiasm for financial futures has

*Options on financial futures can be either bought or sold. The buyer has the right, but not the obligation, to assume either a long or short position in a specified futures contract. The seller, or the "writer," has the obligation to assume a long or short position in a specified futures contract if the buyer of the option chooses to exercise it. The buyer of an option pays a market-determined price, known as a premium. The maximum loss possible for the buyer of an option is the price paid for the option.



spread overseas. The London International Financial Futures Exchange opened for trading on September 30 with contracts based on Euro-dollar time deposits, gilts, three-month sterling deposits, and foreign currencies. An Asian exchange is expected to open by the middle of next year.

Finally, the number of participants in futures markets has climbed steadily. A recent *American Banker* survey revealed that, of the 50 largest commercial banks in the U.S., 37 are now active users of financial futures. Two years ago only a handful were involved.

Futures markets in grain date from before the Civil War. For well over a century, the existence of futures markets has allowed agribusinesses, wholesalers, and import/export firms to hedge the purchase and sale of farm commodities. Using exactly the same principles

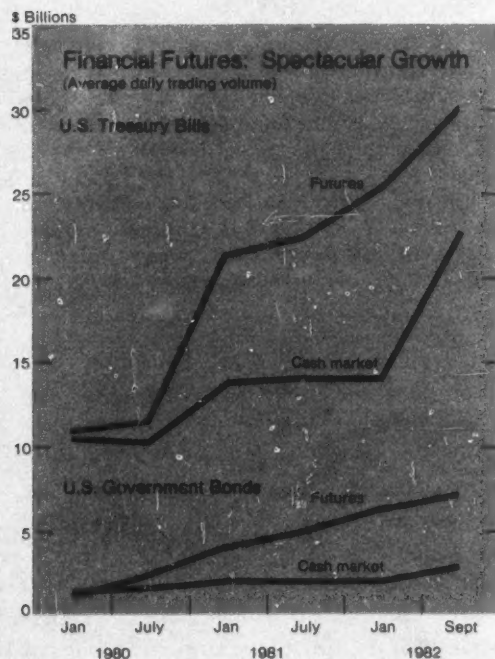
and techniques, financial futures allow the corporate treasurer, money manager, or investor to hedge the cost of funds, lock in an anticipated rate of return, or protect a portfolio position.

Financial futures contracts trade like the traditional agricultural futures. A financial futures contract is a commitment to buy or sell a specific financial instrument at a specific price during a specific period of time in the future. Contracts are traded only on the floor of a regulated exchange where bids and offers are shouted out in a trading pit—allowing all exchange members simultaneous access to the prevailing market.

The exchanges require that a good-faith deposit or performance bond—called initial margin—be put up in the form of cash, government securities, or letters of credit. The required deposit is equal to a fraction (generally less than 5%) of the asset value of the contract and is usually pegged to the value of the maximum price move a contract may make in a single day. Both sides—buyers and sellers—must post margin. In addition, as the price of futures contracts changes daily, variation margin equal to the gain or loss for each open contract position must be posted daily through a clearing house, insuring that no losses are carried forward beyond the next trading day. This means that all open positions are carried at current market value.

Participants in financial futures markets include speculators, arbitrageurs, and hedgers. Each is important to the functioning of a futures market.

Speculators. Speculators provide moment-to-moment market liquidity. They buy and sell futures contracts for one reason: profit. Speculators may include wealthy individuals, partnerships, and investment groups with large amounts of risk capital. They generally take “uncovered” (unhedged) positions and are looking for favorable price movements within a short period



FUTURES AT WORK — SOME EXAMPLES

THE following examples illustrate how futures can help to insulate users from interest-rate risks. A corporate money manager, for instance, can use financial futures to hedge an anticipated investment:

On August 5, the money manager expects an inflow of \$25 million on September 30. He plans to invest those funds in 90-day Treasury bills. The manager finds the prevailing T-bill yield of 9.80% attractive, but he projects that interest rates will soon decline.

How can he take advantage of the prevailing rate in early August when investable funds will not be available until the end of September? The money manager uses T-bill futures to reduce the effect of a projected decline in interest rates.

Step 1: The manager buys 25 December T-bill contracts (worth \$1 million each) on August 5 at a price of 88.43.

Step 2: The \$25-million inflow is received on September 30 as expected and invested in T-bills. By then, as the manager had projected, T-bill yields have fallen, to 7.54%.

Step 3: Also on September 30, the manager sells the 25 December T-bill futures contracts. Because interest rates have fallen, the price of these contracts has risen to 91.37, for a gain of 294 basis points per contract. Each basis point gain is worth \$25; the total gain on the 25 contracts is $294 \times 25 \times 25$, or \$183,750.

The total yield on the investment is: \$476,486 (interest on 25 T-bills at 7.54%) + \$183,750

(gain on futures transaction), or \$660,236 (effective yield of 10.45% on \$25 million).

The result, then, is that the money manager has earned an effective yield on the \$25-million investment even better than he would have earned by investing funds in the cash market on August 5. The reason for this added return is that the basis—the difference between the prices of T-bills and of T-bill futures—narrowed over this period.

	August 5	September 30
T-bill cash price:	90.20	92.46
T-bill futures price:	88.43	91.37
Basis:	+1.77	+1.09

It is conceivable, of course, that the basis could have widened. This would have adversely affected the total return on the transaction.

Hedging against a rise

As another example, consider a corporate treasurer whose company needs to borrow \$5 million. The treasurer expects interest rates to rise and would like to minimize the increase in his borrowing costs. Here's how that might be done:

Step 1: On January 15 the treasurer arranges to borrow \$5 million on a fixed-rate basis for drawdown on February 16 and repayment on May 17. He agrees to pay interest on the loan

of time. An important group of speculators are those who trade on the floor of the exchange (known as "locals"). Positions taken by speculators may be substantial, because of the leveraging afforded by the small initial margin requirements. As a consequence, speculators' gains or losses can be enormous. For example, the recent dramatic rise in bond prices meant that a speculator who guessed right—that bond

prices would rise with a consequent decline in yields—could have doubled his money within a few days. Such gains, of course, are balanced by someone else's losses—perhaps a speculator who guessed wrongly that bond yields would hold steady or go higher.

Arbitrageurs. These traders are on the alert for price differentials and hence profit opportunities that may exist just temporarily between

at the prevailing interest rate for certificates of deposit (CDs) on February 16, plus 200 basis points. The cost of borrowing on January 15 (based on that day's CD rate) would have been approximately 15.60%.

Step 2: At the time he arranges such a loan the treasurer applies a hedge. He "goes short"—sells—five CD futures contracts (at \$1 million each) maturing in March* at the current market price of 85.14.

Step 3: When February 16 arrives the treasurer finds that interest rates have, in fact, risen. He draws down the \$5-million loan at an interest cost of 18.20%. But the rise in interest rates has meant a decline in financial futures prices, including CDs. The treasurer is able to buy back at a price of 84.00 the futures contracts sold in the previous month—a gain of 114 basis points (\$2,650) on each contract.

Step 4: On May 17 the treasurer repays the \$5-million loan, plus interest of \$227,500. Part of that cost is covered by the \$14,250 profit made in the futures market—reducing the treasurer's net outlays to \$213,250. That amount as interest on a \$5-million loan works out to a 17.06% borrowing rate. By using futures, the treasurer has been able to offset part of the increased cost of borrowing.

*If the \$5 million in borrowing had been a floating-rate loan, the treasurer would have sold futures to coincide with each time the rate would be altered in the future. Floating rate usually implies that the rate changes every one, three, or six months.

the cash and futures markets or between one futures contract and another. Actions of arbitrageurs tend to pull a temporary disparity in prices between the cash and futures markets back into line.

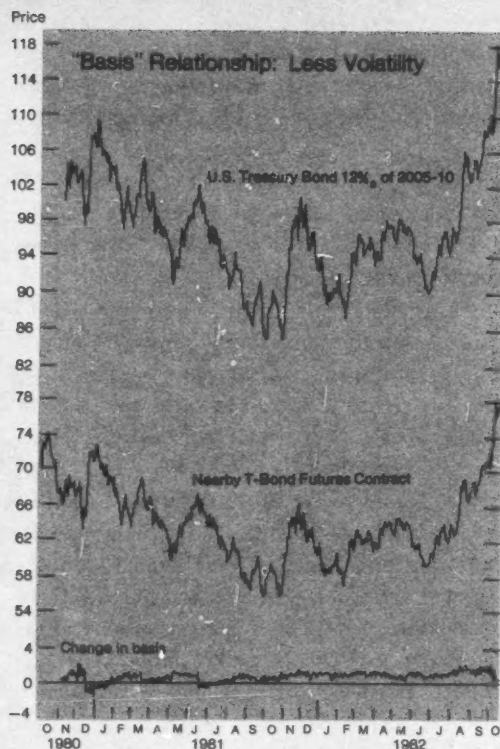
Hedgers. These market participants try to minimize risk by taking a position in the futures market opposite to that which they are taking in the cash market. Any changes in in-

terest rates in the cash market affecting the cost of funds or the value of a portfolio will thus be offset by gains or losses on the hedger's futures position. The original purpose of the markets was to allow hedging of the value of an asset or liability. Thus futures markets allow commercial entities with exposure to the risk of price change to shift their risk to others trading on the exchange.

Cash market prices and futures prices of financial instruments generally move in tandem. This is not surprising, because both markets are influenced by the same factors such as economic trends, government policies, and interest-rate expectations.

Still, there is no such thing as a perfect hedge. Prices in the cash and futures markets can move independently, even though such differences are usually limited. The difference between a security's cash market price and its futures price is known as the "basis." Changes in the basis generally are much more narrow than are changes in either cash prices or futures prices, as can be seen from the chart on page 10. The principle governing the price movement of futures contracts is that the prices of the cash item and of the futures contract converge at delivery into the contract. The hedger, then, replaces the risk of exposure to a change in the level of interest rates with a smaller risk of change in the basis. Even so, a basis change can mean that a hedger's interest-rate risks are only partially covered—as is demonstrated in the accompanying box.

A technique known as cross-hedging can be used to manage risks associated with financial instruments in which there is no futures trading. There are no corporate bond futures, for example, but hedging can be accomplished by buying or selling Treasury bond futures. This is possible because there is reasonable corre-



lation between movements in Treasury bond futures prices and those in the corporate bond market. Similarly, Treasury bill, certificate of

deposit, and Eurodollar deposit futures could be used to hedge against changes in bank lending rates. However, basis risk is usually greater in a cross-hedge than it is when the hedge involves the same financial instrument in both the cash and futures markets.

Future of futures

The development of financial futures has added a new dimension to the money and capital markets. Clearly, such markets are complex and require considerable financial acumen. Decisions need to be made today covering events months from now. Whether they are speculators, arbitrageurs, or hedgers, those who deal in financial futures need to have clearly defined strategies. The cost of hedging, for example, may be greater than the perceived interest-rate risk a money manager wants to guard against. The decision may be to leave an interest-rate exposure uncovered. But the important point is that with financial futures the money manager now has an additional tool.

The past two years have seen record trading volumes, new products, new markets, and the internationalization of financial futures. And that is likely to be only the beginning.

World Population: Progress or Predicament?

CONCERN over the trend in world-population growth seems to come in waves. In the 1960s cries of alarm were prevalent. A population bomb was said to be ticking away that threatened a future "explosion"—mass unemployment, food shortages, and political and social turbulence.

In the 1970s, such warnings grew decidedly mute. Fewer "population crisis" stories appeared in the media. Indeed, some demographers became quite reassuring: the population bomb, they argued, had been defused, the population explosion had fizzled.

Now, as the 1980s get under way, concerns

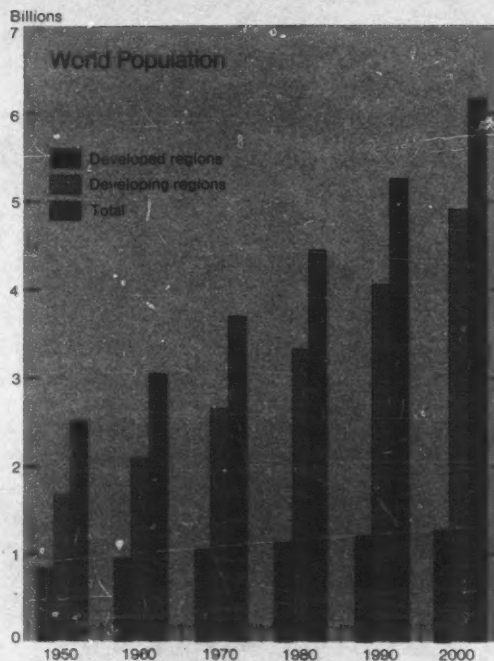
about population once again are being voiced. The major stress is being placed on the size of the population base and on the sheer numbers of people being added—roughly 200,000 day in and day out. That is nearly equivalent to adding the population of the United States to world population every three years.

Behind the reassurances of the 1970s is the trend in the global population. It is still expanding, but the growth rate has begun to decline at a surprisingly rapid pace. The world-population growth rate, which had risen from 1.76% in the mid-1950s to 1.99% by the mid-1960s, has since dropped to 1.72%—a decline of nearly 14%.

The dramatic slowing in growth, if it continues, means that, by the year 2000, world population could be nearly 20% below levels projected by United Nations demographers in the early 1960s. World population, currently at 4.5 billion, is now projected to reach 6.2 billion* in the year 2000—1.4 billion fewer people than the estimates of 20 years ago.

Populations have nearly stopped expanding in the world's industrialized nations. In the United States, Japan, and the Soviet Union the population is growing at a rate of less than 1% a year. Demographers have found that seven countries in Europe have already achieved a population that has stopped growing.**

Birth rates continue high in the developing world, but a clear reduction is evident everywhere except in Africa. Cuba, for example, cut its birth rate nearly in half between 1965-70 and 1975-80. China, with a quarter of the world's population, reported a 34% decline in its birth rate in that same period. Reductions



Source: United Nations

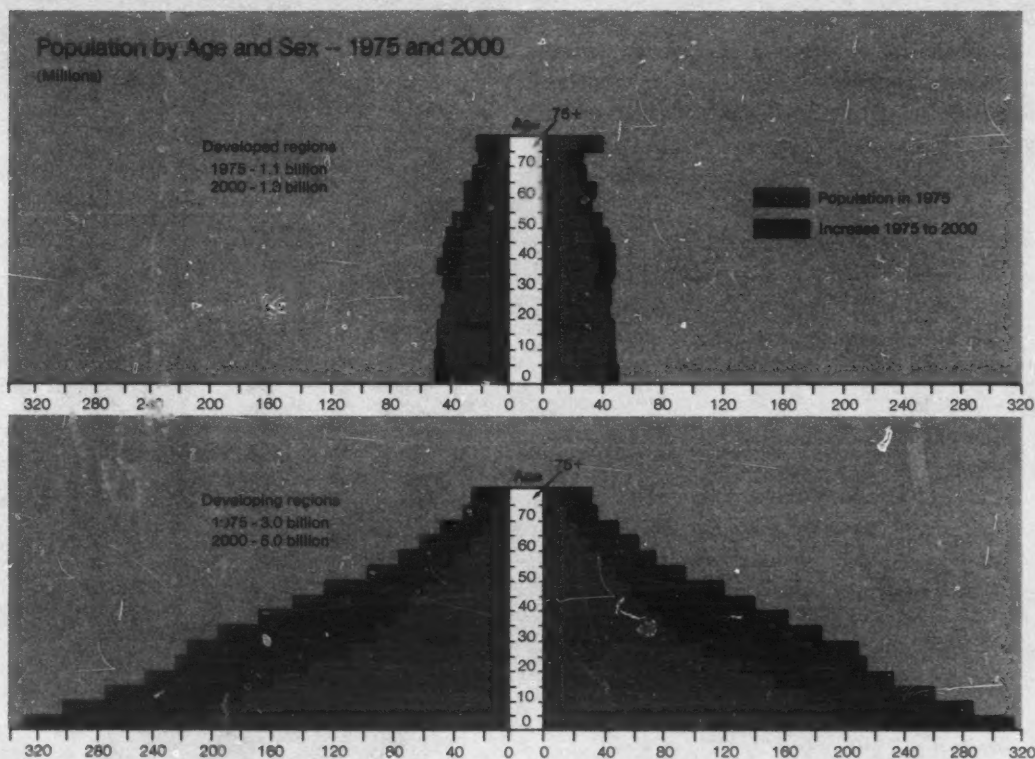
in birth rates ranging from 15% to 25% were recorded in Chile, Colombia, India, Indonesia, Republic of Korea, Malaysia, and Thailand.

Slower population growth among developing nations reflects a shift in cultural attitudes and economic priorities. As levels of education have risen—accompanied by enlarged employment opportunities for women—and as family planning services have become more accessible, the decision in many parts of the developing world has been to have fewer children.

Government efforts to slow population growth have intensified. By 1980, some 59 developing countries had programs aimed at lowering or maintaining fertility rates (the number of children born each year per 1,000 women aged 15 to 44), compared with only 26 such countries in 1969. An added 21 countries now

*Medium projection. Estimates for 2000 range from 5.9 billion to 6.4 billion.

**Austria, Belgium, East Germany, Luxembourg, Sweden, United Kingdom, and West Germany.



Source: U.S. Bureau of the Census.

consider their fertility rates to be too high but have not yet adopted interventionist policies.* All in all, developing nations are spending an estimated \$1.5 billion on population control programs. As recently as 1967 less than \$100 million was being spent on such efforts.

Despite the slowing in world population growth, it would be premature to dismiss concerns about the future. For one thing, population tallies and projections are far from reliable even in industrialized countries. For another, recent trends may not continue. Human nature

*In some places the trend is in the other direction. In 1980, some 21 governments considered their fertility rates as too low. Some 17 have policies to raise fertility rates.

being what it is, people could change their minds about family size.

Moreover, while population growth rates have declined dramatically, the population base keeps getting larger. At the current annual growth rate of 1.7%, nearly 75 million people are added to the world population each year. That's more than the combined populations of France and the Netherlands.

By the year 2000, the growth rate of world population is projected to decline to 1.5%. But with a population at that time of 6.2 billion, the actual number of people being added annually will climb to 93 million—the equivalent of another present-day Bangladesh *every year*.

An added concern is the age makeup of the population, particularly in the developing nations. The chart on page 12, showing population by age and sex between 1975 and 2000, illustrates the problem. Among developed countries, the pattern reflects a trend toward stabilization: slow growth, roughly the same number of people in each age group up to age 55, and hardly any rise in the number under age 30. The pattern in developing nations is sharply different: rapid growth with a large increase in each succeeding five-year period in the number of people entering their reproductive years. Even if family size should continue to decrease,

the total number of births will continue to go up for many decades to come—assuming no famines, nuclear holocaust, or other disaster.*

A further problem is that population growth will be taking place mainly in areas least able to afford it. The population of developing regions, which now account for roughly 75% of the world's people, will be an increasingly large

*World population growth could continue for another 130 years before it finally stops, according to United Nations' estimates. Using a medium projection, the U.N. demographers place the stabilization date at 2110, at which point the population would total 10.5 billion—about two and a half times its present size. The U.N.'s low projection sees stabilization at 8 billion people in the year 2060.

WORLD URBANIZATION

THE population of the world's cities has doubled since 1950. It seems likely to double again by the end of this century. Indeed, half of all the people in the world in the year 2000 will be living in cities (compared with less than 40% in 1975), according to United Nations' projections.

Thirty years ago there were only six cities with a population of 5 million or more. Their combined population was 44 million. By 1980 the number of major cities had grown to 25—with a combined population of 250 million.

By the end of this century more than 60 cities are expected to have populations of 5 million or more. Their combined population will exceed 650 million.

Projected trends in urbanization are shown in the accompanying table. The fastest growth will come in less developed countries. For example, of the world's fifteen largest cities in 1950, eleven were in industrialized countries. But by the year 2000, twelve of the fifteen largest cities—or, more precisely, metropolitan areas—are expected to be in developing countries (shown in bold face type in the table).

Super Cities

(Millions of population)

	1950		2000
New York	12.3	Mexico City	31.0
London	10.4	Sao Paulo	25.8
Rhein-Ruhr	6.9	Tokyo	24.2
Tokyo	6.7	New York	22.8
Shanghai	5.8	Shanghai	22.7
Paris	5.5	Beijing	19.9
Buenos Aires	5.3	Rio de Janeiro	19.0
Chicago	4.9	Bombay	17.1
Moscow	4.8	Calcutta	16.7
Calcutta	4.4	Jakarta	16.6
Los Angeles	4.0	Seoul	14.2
Osaka	3.8	Los Angeles	14.2
Milan	3.6	Cairo	13.1
Mexico City	3.0	Madras	12.9
Philadelphia	2.9	Manila	12.3

THE PEAKING OF AMERICA

THE population of the United States, which now stands at 232 million, will reach 268 million by the year 2000 and peak at 309 million in the year 2050.

These Census Bureau estimates project that the number of deaths in the United States will equal the number of births by 2035. But immigration will keep the numbers of Americans rising for another fifteen years. After 2050, however, deaths are forecast to exceed births and immigration, resulting in the nation's first population decline.

Some demographers question a declining trend in U.S. population beginning in 2050. Such a forecast assumes a constant net immigration of 450,000 a year. The skeptics maintain that such a level of immigration is unrealistic. They note, for example, that Mexico's population will rise from 71 million today to 100 million by the year 2000. Some analysts think that by the end of the century illegal immigration from Mexico alone could reach 1 million a year.

portion of the total. By the year 2000 four out of every five people will be living in areas that today have average per capita incomes of \$1,000 or less. And the great bulk of that population increase will come in giant cities (box on page 13), already crowded, slum-ridden, and short of jobs.

Ricardo revisited

The gloomy arithmetic of absolute numbers has brought yet another swing in the pendulum. Warnings about rising population pressures are again being voiced. For example, Worldwatch Institute, a Washington-based research group, last year published a study showing that cru-

cial biological systems—fisheries, forests, grasslands, croplands—already are being strained.* World production of wood per capita was found to have peaked in 1964; fish in 1970; beef in 1976; grain in 1978; and oil in 1973.

Given those trends, analysts have begun to reread David Ricardo, the nineteenth century English economist. He articulated the Law of Diminishing Returns, reasoning that at some point additional food could be produced only by extending cultivation onto less fertile land or by applying ever more labor and capital to land. In either case, returns would diminish. History shows, of course, that Ricardo was wrong. For well over a century cultivated areas continued to expand and gains in agricultural technology resulted in bountiful harvests.

It could be, however, that Ricardo was merely ahead of his time. In countries as disparate as Canada, Brazil, and China, for instance, ever larger amounts of land are required to replace fertile land lost to urban growth, construction, or other development. Yields per acre are barely being maintained, according to government studies. The lesson in this may be that, as geographic frontiers shrink, advancing technology may not always be able to prevent diminishing returns.

The latest gloomy warnings could prove to be as excessive as those that preceded them. People and governments might very well take actions to curb population growth more quickly than anyone now thinks possible. The reductions in population growth rates in the past decade have surprised most analysts. Still, given the massive population base, it would be imprudent to dismiss concerns about the future.

**Building a Sustainable Society*, by Lester R. Brown, W. W. Norton & Company, 1981.

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January

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How Needy Are They?
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Set to Decline
Behind the Weekly Money Numbers
Housing's Next Five Years

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A Need for Perspective
Electric Utilities:
The Challenge Ahead

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